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ETTINGER'S TEXTBOOK OF
**Veterinary
Internal
Medicine**
Ninth Edition

50
years
1975-2025



Etienne **Côté**
Stephen J. **Ettinger**
Edward C. **Feldman**


VOLUME 1



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Etienne **Côté**
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VOLUME 2



2-Volume Set

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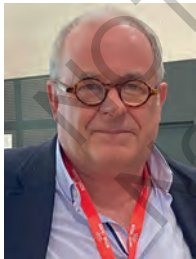
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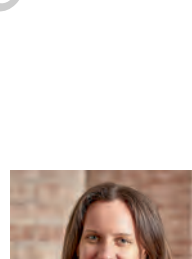
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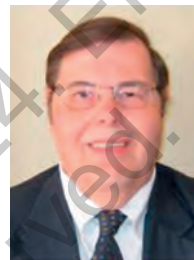
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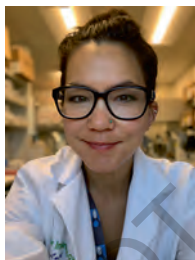
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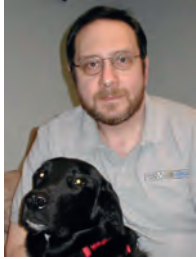
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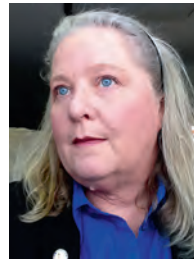
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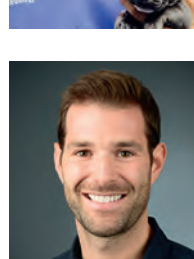
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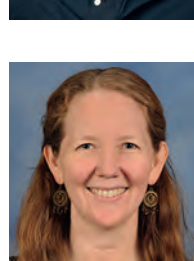
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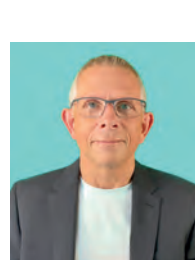
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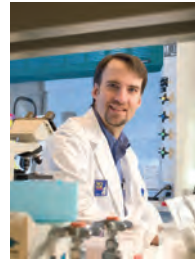
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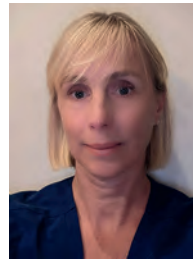
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Preface

EVERY BOOK HAS A STORY TO TELL

Every book has a story to tell, and the 9th edition of this textbook is not different since it too has its own story. Fifty plus years ago I set out on an unknown journey to write a second textbook following the publication of *Canine Cardiology* (1970). The reasons for the book in 1975 were simple but not very well thought out. WB Saunders, Inc., the original publisher, was looking for a veterinary textbook to follow in the path of Cecil's *Internal Medicine* for human beings. I was offered the opportunity to write and edit a 350-400-page textbook. It was intended to be an all-encompassing book about small animal veterinary science. My then partner/mentor Dr. Ray Roberts (dec.), who was the principal of our unique small group veterinary specialty practice, suggested I consider the offer. I did, but with little anticipation that the effort would consume the remainder of my professional career along with several other exciting efforts that included full time clinical small animal practice, teaching and exciting clinical research endeavors.

At the time of the first edition—circa 1975 (then US Mail but no FedEx, and no computers) it was typewritten manuscripts that were submitted for proofreading or in some cases, occasionally not submitted at all! Yet with diligence and much help from close veterinary friends we managed to produce something that seemed to meet our goals. However, WB Saunders asked for a book on general veterinary science. I gave them something that consumed two volumes and over 2,000 pages. This page limit has since not changed over 9 editions. At the same time, our profession was growing rapidly; specialties were first becoming recognized, while enthusiastic practicing colleagues were asking for even more. Those were the days when only a few universities had clinical residency programs and others still disagreed with the need for them. The growth of specialized veterinary practice was initially observed at the university level and soon thereafter at a few of the partially specialized private practices. Shortly after, we recognized the rapid proliferation of specialty and emergency practices throughout larger cities in North America and beyond. These were all new but very much in demand (ACVS, ACVO, ACVIM, and growing). What were then only a few clinical specialty organizations in North America now has become common around the world. Veterinary meetings developed almost as fast as one could count them; the specialties grew quickly and the demand for more, better, and larger groups became the expected. Instead of fear of referring, it became the go-to norm for difficult or challenging cases. Critical care became available 24/7 instead of as dictated by “on-call” veterinary services in more urban areas.

While I had been involved in the training of many wonderful younger veterinarians at The Animal Medical Center (AMC) in NYC there was no end to the requests for more and better services. Our colleagues met these needs and built specialty practices, emergency clinics and veterinary residency programs that filled the requests of younger students who were looking to enhance the growth of the profession, providing even more fulfilling, better service and medicine for clients' pets. In our own practice I recognized that there were younger graduates who wanted to offer even more choices and to be able to offer more specialized veterinary care. In Berkeley, CA, my first official resident (I had others before but there was no system then for acknowledging their training) was

Dr. Ed Feldman (Prof. ret. UC Davis). Ed developed quickly as an outstanding internist and developed his own program in endocrinology while participating part-time at the UCSF Medical School to become one of the few (to become many) endocrine and reproductive specialists lecturing and providing the profession with real hands-on expertise and experience. This essentially recognized the concept of excellence in clinical veterinary practice of the well-trained clinician. As the book's popularity was growing and I realized the need for help, I asked Ed to join me to further develop the textbook (4th ed., 1995). Together we added other veterinarians to our contributor list and more importantly to bring new voices to our textbook while expanding the author pool worldwide. I believe we successfully did that and in the 8th edition we included national flags to indicate where the authors hailed from (23 countries). Today the list is so inclusive that one would think we have become a mini-United Nations of veterinarians!

After several more editions, the task continued to grow and another one of our intern-residents, Dr. Etienne Côté (Prof. UPEI) joined us more than a decade following his dual board certification for the eighth edition to continue to build the textbook and carry it into the next decade. Following his success developing *The Clinical Veterinary Advisor*, Etienne has brought with him an even more challenging goal of carrying this book to new levels (new medical sections, genetic associations, and more minimally and/or non-invasive techniques, plus an even larger, narrated, and well-organized video collection). Our goals then and now are to continue to spread the knowledge relevant to our entire profession to six of the seven world continents. It should be noted that we have chosen experts from around the world to provide us with their expertise. As the developer and first editor of the Textbook I could not have chosen better lifetime partners (**other than my wife Pat**). Individually and together, we have managed to remain connected in our professional and personal lives. I am incredibly fortunate to have chosen as I did. Together, we have chosen colleagues with great teaching credentials and the best writers and scientists to work at this with us. While our choice of authors is limited to those we know, those who have published refereed scientific papers or those who have been selected by our contributing editors for their chapters, we have worked diligently to find true experts in their fields. We have often asked near total strangers who have written previously on their topics, colleagues whom we have worked with and occasionally simply new folks with known expertise who have published in refereed journals about their fields of investigation and expertise. New authors are always wanted, and we invite those with such interests to talk with us. We also wish to let everyone know that usually there can only be a single author (or two) for a chapter. There are many in our profession who could do equally well in writing, but space and people are chosen based on what they have published. We absolutely recognize that other outstanding colleagues exist and over time we hope that we have chosen well, particularly in looking for new authors who wish to prepare, author, and edit and who are keen on maintaining the strict guidelines that we insist on regarding completion time, editing and a strong interest in publishing.

Who should be reading this textbook? Often this is a question we receive from veterinarians, students and occasionally clients and

other scientists. All of us have agreed that the following list covers most of those who have chosen to utilize this textbook. While it is difficult to identify individuals, let us give you an idea as to whom we believe the book is intended to benefit:

1. A veterinary student who appreciates the importance of high-level facts in *evidence-based* medicine and wants to benefit first from an overview of the topic, before looking up individual articles on specific topics.
2. Any veterinarian who wants the cream-of-the-crop collection of detailed disease summaries written by 315+ worldwide leading experts.
3. A keen practitioner who wants more than the cookie-cutter recipe and is looking to truly understand a disease process, a procedure, or a clinical sign.
4. An intern or new graduate who is learning advanced techniques and wants a current summary for understanding background information or wants instructions for how to perform specific technical processes and will be guided by videos demonstrating the techniques.
5. A resident who wants to cover a topic in preparation for a specialty board examination.
6. A specialist who wants to review a familiar subject within the specialty for confirmation and updates, or a different specialty to get up to speed on a less-familiar area.

This is but a brief story of the Textbook from its inauspicious beginning through this 50th anniversary 9th edition. The book, like our profession, is seeing and anticipating continued growth. There indeed will be changes that, like the book, will introduce new areas to consider, new guidelines for practice and new approaches to veterinary care. This is what will become part of what we do (in practice) and in new editions of the textbook.

We broach the subject of electronic communications. Textbooks would appear not to be part of the dismissive society that has been a part of recent changes in how we learn, read and study. Regarding advantages of updates in methodology and learning, there would appear to be no end to the voracious appetites of veterinarians to learn and improve their own skills and knowledge. Be it areas of learning new practice techniques, implementing new strategies to approach the small animals we are here to serve, this book will continue to remain at the forefront in providing and describing new and updated skills. The textbook does not enter the philosophic discussion of right or wrong, excessive or restricted practice but rather presents a reasonably inclusive report on how to visualize what we can do. The 9th edition goes into far greater depth in describing newer and often less invasive techniques of practice as well as a much broader review of intensive and critical care that has grown tremendously even since the last edition. Infectious diseases have been expanded to include greater clinical knowledge. Many chapters have been extensively revised or totally rewritten to provide updated information. We recognize the greater concern for a wide spectrum of diseases and the treatment and recognition of different diseases that are restricted to distant environs. The ongoing discussions of autoimmune diseases are based on methodologies for approaching, diagnosing and treating these complex conditions. All these considerations are recognized and approached as we sought to include changes in the medical subsections. Chapters and sections on these topics have been revised but continue to stress so many of the current updated areas that remain the backbone of clinical veterinary medicine including basics of toxicology, nutrition, clinical pharmacology, and clinical pathology. The latter has been expanded to meet the information especially relevant to the recognition of different cancer types at the clinical level. We have continued to maintain the body composition (BCS) and muscle composition (MCS) measurement charts (incorporated on the inside covers of the textbook) to re-emphasize their importance to the diagnosis and treatment of common as well as unusual diseases. There are these

and other multiple reference charts for quick referencing inside the covers of the textbook and online for your review. How often do we see dogs or cats with an abdominal fluid collection where the owners feel that their pet has increased its body weight because of the distended abdomen but instead the pet has free abdominal fluid, has lost significant muscle mass, is hyporexic, cachectic, and frail?

Many of your questions are answered by utilizing this text, while others will emerge that build off this foundation of knowledge. Despite the incredible advances in science, our method of practice has **not** radically changed. Rather it changes through new information slowly (or rapidly) that has disseminated its way into the practice of medicine. An interesting paper was published in the veterinary literature recently titled “*Where Is the Evidence?*” (doi.org/10.1111/vsu.13819) In this study, the authors appropriately ask the question and spend a significant time talking about the need for students reviewing published information about specific surgical techniques, the need to really learn through repetitive practice and the time involved in exploring learning and teaching. The book allows for a review of the extensive collection not only of published literature but also of numerous (thousands of) drawings, diagrams, radiographs, and charts that highlight the 331 chapters. Additionally, there are over 700 videos that introduce the reader to the most up to date and common techniques, examples, and processes in making diagnoses that assist the viewer to make correct decisions and to amplify the method of diagnostics. This edition of the textbook maintains many of the useful videos from previous editions (properly identified as to their source) plus all the new videos submitted for this edition. Likely, there is no other collection of internal medicine-based videos that accompanies such unique and outstanding teaching methods in our profession. These videos are embedded into the textbook chapters and are available to anyone who utilizes this 9th edition electronically. All the videos are clearly identified in the chapters and may be viewed online at your convenience. Learning tools that accompany many chapters present the clinical diagnosis, often by utilizing a modified Bayesian clinical reasoning technique. This method presents us with one of the most effective and direct methods of help, often leading to a specific diagnosis by identifying less frequently observed or inappropriate conditions that can be ruled out. Such a system, while appearing complex, provides the interpreter with better, more specific clues to the decision-making process. It not only takes the signalment into consideration but the probability of various diagnoses and testing results into consideration. Used properly, this algorithmic method directs the reader to a most likely conclusion. Essentially, we are using a prioritized differential diagnosis to separate and elevate the actual diagnosis. Over the years we have continued to include algorithms that elevate this technique for establishing a secure differential diagnosis. A goal of internal medical diagnoses is not to blindly guess at a diagnosis but rather to appropriately lead us to the correct diagnosis, when possible, with minimal distraction. General practicing veterinarians and specialists may have already captured these concepts in their minds, but there are times when an important diagnostic clue is forgotten or omitted. It is for this reason that we encourage a review of such diagnostic challenges.

Finally, to introduce the reader to the textbook we have eliminated all sections of the book that don't directly apply to internal medical disorders. There are many business, psychology and self-help books that provide such information. The exceptions to this change are the first nine chapters in the book. These incorporate very essential information for clients and others. We hope you will read these chapters since they cover all general medical topics that are requisite to practicing good veterinary medicine. Included topics are *Client Communication*, *Taking a Complete Medical History*, *the Complete Physical Examination*, and the concept of *Evidence-Based Medicine*. In addition, please examine the thorough and important chapters on *Biomedical Statistics*, *Pain Identification*,

Antibiotic Stewardship, and *International Travel* (both the requirements for travel and identifying exotic diseases). Health concerns of imported pets, those traveling to areas of the world where certain diseases are endemic or of concern are prominently identified. Each of these chapters is thorough and of worldwide concern in a way that we believe is integral to today's practice of excellent veterinary medicine.

Finally, it would be inopportune to end this "story" without huge words of appreciation to our incredible veterinary associates (our associate editors) who have provided us with new author's names, provided us with ideas for updating chapters, and in general allowed this book to come together. They cannot be given enough credit for their continued support and assistance. They are listed on the opening pages of the textbook.

To those at the Elsevier Publishing Corporation in both Philadelphia and St. Louis we extend an enormous level of thanks to Ms. Joanie Milnes and Ms. Kristine Feeherty, both of whom managed different levels of development and production for this title and who worked hand in hand with all three of us over several years as we struggled, and they persisted, so that we could accomplish the "impossible." These two consummate professionals cannot be duplicated. To Ms. Jennifer Catando, our contact with Elsevier, we note our gratitude since it is she who kept us all on track and provided us with the finest development professionals. Many thanks to Amy

Buxton for this edition's superb design. We thank Ms. Catherine Jackson for her essential leadership in Production. Our copyeditors Joanne Gosnell, Jane Koplrow and Megan Westerfeld worked diligently with Ms. Feeherty to keep everything clear, on time and hopefully with minimal editorial errors beyond what might be anticipated in a two-thousand-page textbook. Salut to Mr. Dave Dipazo who worked diligently with us in further developing the video content to make it more readable and integrated into the Textbook. Last but certainly not least, a heartfelt note of undying thanks to our own editorial assistant, Ms. Margaret McPike, whose work in author contacts, manuscript handling, and video management was peerless. Margaret, we couldn't have done it without you.

We have worked to assure the correct spelling of disease names, equipment utilized, and the correct dosage of drugs advocated in veterinary medicine. Nevertheless, we strongly recommend carefully reviewing drug dosages in the event there is a discrepancy between what you understand and what has been written elsewhere.

Thank you for bearing with me as I have related my role in this continuously developing production process for the past half century.

Steve Ettinger
Laguna Beach, CA

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Body Condition Score



UNDER IDEAL

- 1 Ribs visible on shorthaired cats. No palpable fat. Severe abdominal tuck. Lumbar vertebrae and wings of ilia easily palpated.
- 2 Ribs easily visible on shorthaired cats. Lumbar vertebrae obvious. Pronounced abdominal tuck. No palpable fat.
- 3 Ribs easily palpable with minimal fat covering. Lumbar vertebrae obvious. Obvious waist behind ribs. Minimal abdominal fat.

IDEAL

- 4 Ribs palpable with minimal fat covering. Noticeable waist behind ribs. Slight abdominal tuck. Abdominal fat pad absent.
- 5 Well-proportioned. Observe waist behind ribs. Ribs palpable with slight fat covering. Abdominal fat pad minimal.

OVER IDEAL

- 6 Ribs palpable with slight excess fat covering. Waist and abdominal fat pad distinguishable but not obvious. Abdominal tuck absent.
- 7 Ribs not easily palpated with moderate fat covering. Waist poorly discernible. Obvious rounding of abdomen. Moderate abdominal fat pad.
- 8 Ribs not palpable with excess fat covering. Waist absent. Obvious rounding of abdomen with prominent abdominal fat pad. Fat deposits present over lumbar area.
- 9 Ribs not palpable under heavy fat cover. Heavy fat deposits over lumbar area, face and limbs. Distention of abdomen with no waist. Extensive abdominal fat deposits.

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Lafamme DP. Development and validation of a body condition score system for cats: A clinical tool. *Feline Pract* 1997;25:13-18.

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Body Condition Score



UNDER IDEAL

- 1 Ribs, lumbar vertebrae, pelvic bones and all bony prominences evident from a distance. No discernible body fat. Obvious loss of muscle mass.
- 2 Ribs, lumbar vertebrae and pelvic bones easily visible. No palpable fat. Some evidence of other bony prominences. Minimal loss of muscle mass.
- 3 Ribs easily palpated and may be visible with no palpable fat. Tops of lumbar vertebrae visible. Pelvic bones becoming prominent. Obvious waist and abdominal tuck.

IDEAL

- 4 Ribs easily palpable, with minimal fat covering. Waist easily noted, viewed from above. Abdominal tuck evident.
- 5 Ribs palpable without excess fat covering. Waist observed behind ribs when viewed from above. Abdomen tucked up when viewed from side.

OVER IDEAL

- 6 Ribs palpable with slight excess fat covering. Waist is discernible viewed from above but is not prominent. Abdominal tuck apparent.
- 7 Ribs palpable with difficulty; heavy fat cover. Noticeable fat deposits over lumbar area and base of tail. Waist absent or barely visible. Abdominal tuck may be present.
- 8 Ribs not palpable under very heavy fat cover, or palpable only with significant pressure. Heavy fat deposits over lumbar area and base of tail. Waist absent. No abdominal tuck. Obvious abdominal distention may be present.
- 9 Massive fat deposits over thorax, spine and base of tail. Waist and abdominal tuck absent. Fat deposits on neck and limbs. Obvious abdominal distention.

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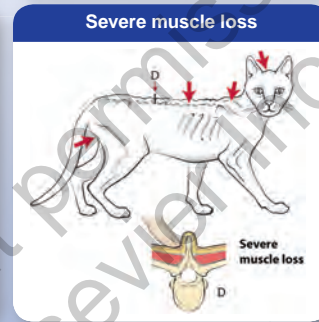
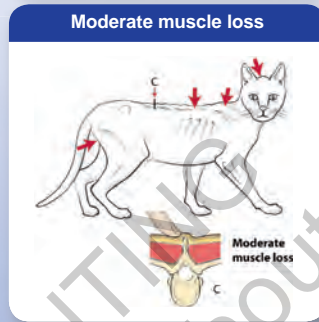
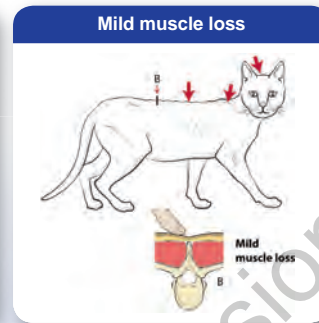
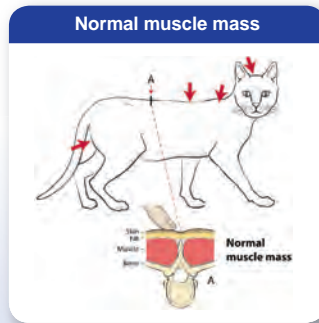
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Muscle condition score

Muscle condition score is assessed by visualization and palpation of the spine, scapulae, skull, and wings of the ilia. Muscle loss is typically first noted in the epaxial muscles on each side of the spine; muscle loss at other sites can be more variable. Muscle condition score is graded as normal, mild loss, moderate loss, or severe loss. Note that animals can have significant muscle loss even if they are overweight (body condition score > 5/9). Conversely, animals can have a low body condition score (< 4/9) but have minimal muscle loss. Therefore, assessing both body condition score and muscle condition score on every animal at every visit is important. Palpation is especially important with mild muscle loss and in animals that are overweight. An example of each score is shown on the right.

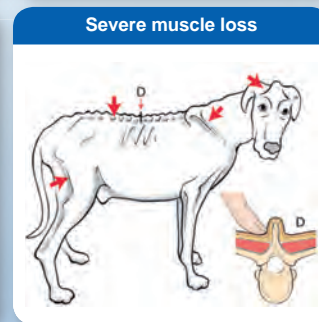
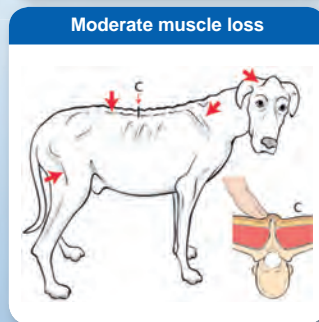
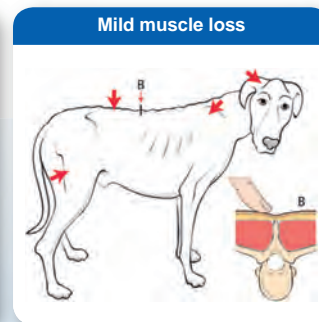
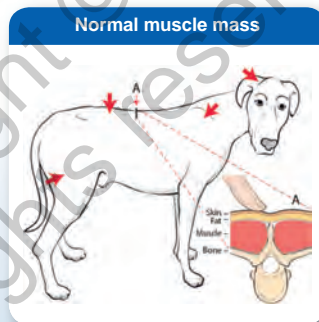
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Muscle condition score

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Dog and Cat Entry Requirements to Top Destinations for Pet Transport

DESTINATION	VEHCS (FULL/PARTIAL/NO)	MICROCHIP Y/N	DOCUMENT (IP/CSAHC/APHIS 7001/RVC)	RABIES VACCINE Y/N	OTHER VACCINES Y/N	RABIES TITER Y/N	OTHER INFECTIOUS DISEASE TESTS Y/N	ANTI-PARASITIC TREATMENTS Y/N	QUARANTINE Y/N	PROHIBITED BREEDS Y/N
Argentina	Full	N	CSAHC/RVC	Y	N	N	N	N	N	N
Australia	Full	Y	IP/VEHCS/RTD	Y	Y	Y	Y	Y	Y	Y
Brazil	Full	N	CSAHC	Y	OPTIONAL	N	N	Y	N	N
Canada	Full	N	RVC or CSAHC	+/-	+/-	N	N	N	N	N
China	Partial	Y	CSAHC/RVC	Y	OPTIONAL	Y	N	N	+/-*	N
Costa Rica	Full	N	IP/CSAHC	Y	Y	N	N	Y	N	N
European Union countries	Partial	Y	CSAHC/RVC	Y	N	N	N	Y	N	N
Hong Kong	Partial	Y	IP/CSAHC/RVC	Y	Y	N	N	N	+/-	Y
Japan	Partial	Y	IP/CSAHC/APHIS 7001-OPTIONAL	Y	Y	Y	N	Y	Y	N
Mexico	No	N	N	N	N	N	N	N	N	N
Philippines	Full	Y	IP/CSAHC/RVC	Y	Y	N	N	Y	N	N
Singapore	Partial	Y	IP/CSAHC/RVC	Y	Y	Y	N	Y	Y	Y
South Africa	Partial	Y	IP/CSAHC/RVC	Y	N	N	Y	Y	N	N
South Korea	Partial	Y	CSAHC	+/-	N	+/-	N	N	+/-	N
United Kingdom	Partial	Y	CSAHC/RVC	Y	N	N	N	Y	N	Y
US-continental		N	eCVI or APHIS 7001/RVC	Y	N	N	N	N	N	N
US-Guam		Y	IP/APHIS 7001/RVC	Y	Y	Y	N	N	+/-	N
US-Hawaii		Y	IP/APHIS 7001/RVC	Y	N	Y	N	Y	Y	Y

A list was compiled of the top international destinations to which owners traveled with their pets in 2019. The information was provided by American Airlines, Air Canada, Delta Air Lines, KLM, and United Airlines, which cumulatively transported approximately 170,000 companion animals via cargo in 2019. (NJ Bryant, personal communication, October 30, 2023). The chart provides the common entry requirements; however, an in-depth review of the entry requirements can be found using the USDA Pet Travel Website.

APHIS 7001, US Interstate and International Certificate of Health Examination for Small Animals; CSAHC, Country-Specific Animal Health Certificate; eCVI, Electronic Certificate of Veterinary Inspection; IP, Import Permit/License; RTD, Rabies Neutralizing Antibody Titer Test Declaration; RVC, Rabies Vaccination Certificate; VEHCS, Veterinary Export Health Certificate.

+/-, May or may not be required.

*Depends on port of entry.

Courtesy Nelva Bryant, DVM, MPH.

Recommended Feline Vaccination

Example of a feline vaccination schedule if kittens are first presented at 8 weeks of age. (Courtesy Mary Marcondes, DVM, MSc, PhD.)

VACCINE	3 WK	8 WK	12 WK	16+ WK ⁽¹⁾	26 WK	CATS >16 WK	CATS >26 WK	REVACCINATION
FPV, FCV, FHV-1; MLV or inactivated (parenteral)		✓	✓	✓	✓	2 doses, 2-4 wks apart; revaccination at 26 wk	1 or 2 doses for MLV; 2 doses 2-4 wks apart for inactivated	No more often than q 3 years ⁽⁵⁾
FCV, FHV-1 +/- FPV; MLV (IN)		✓	✓	✓		1 dose	1 dose	Annual
Rabies			✓	✓		1 dose	1 dose	Annual or triennial ⁽⁶⁾
Feline leukemia virus ⁽²⁾		✓	✓			2 doses, 2-4 wks apart	2 doses, 2-4 wks apart	12 months after initial series, then q 1-3 years PRN ⁽⁷⁾
<i>Bordetella bronchiseptica</i> (IN) ⁽³⁾	✓					1 dose	1 dose	Annual
<i>Chlamydia felis</i>		✓	✓			2 doses, 2-4 wks apart	2 doses, 2-4 wks apart	Annual
Feline immunodeficiency virus ⁽⁴⁾		✓	✓	✓		3 doses, 2-3 wks apart	3 doses, 2-3 wks apart	Annual

AAFP, American Association of Feline Practitioners; DOI, duration of immunity; FCV, feline calicivirus; FHV-1, feline herpesvirus-1; FPV, feline parvovirus; IN, intranasal; MDA, maternally derived antibodies; MLV, modified live virus; PRN, as needed; wk, week; WSAVA, World Small Animal Veterinary Association.

✓ - core vaccine; ✓ - can be considered core where the disease is prevalent; ✓ - non-core vaccine.

(1) If FPV/FCV/FHV-1 begins at <8 wks of age, or interval between vaccines is <3 wks, the number of doses is increased so the last dose is given at ≥16 wks of age. Some kittens have MDA at 20 wks of age, so primary series could be extended to 20 wks of age, with another vaccine given at 26 wks of age. See chs. 201 and 205. **(2)** Considered a core vaccine by AAFP and WSAVA for cats <1 year old. See ch. 199. **(3)** First dose and protocol may change between products. See ch. 205. **(4)** Currently only available in Japan, Australia and New Zealand. Studies of efficacy vary widely, with conflicting results. See ch. 198. **(5)** For FHV-1 and FCV: q 3 years for low-risk cats and annually for high-risk cats. **(6)** Depending on the licensed DOI. **(7)** Revaccinate 12 months after last dose of initial series, then annually for cats at high risk of exposure or q 2-3 years (depending on the vaccine's DOI) for low-risk cats.

Recommended Canine Vaccination

Example of a canine vaccination schedule if puppies are first presented at 8 weeks of age. (Courtesy Mary Marcondes, DVM, MSc, PhD.)

VACCINE	8 WK	12 WK	16+ WK ⁽¹⁾	20+ WK ⁽²⁾	26 WK	DOGS >16 WK	DOGS >26 WK	REVACCINATION
CDV, CPV, CAV; MLV or recombinant	✓	✓	✓	serologic testing	✓	2 doses, 2-4 wks apart ⁽⁴⁾ ; revax @ 26 wk	1 dose	Triennial ⁽³⁾
Rabies		✓				1 dose	1 dose	Annual or triennial ⁽¹¹⁾
Leptospirosis	✓	✓				2 doses, 2-4 wks apart	2 doses, 2-4 wks apart	Annual
Canine parainfluenza virus (CPiV) (parenteral) ⁽⁵⁾	✓	✓	✓			2 doses, 2-4 wks apart	2 doses, 2-4 wks apart	Annual
<i>B. bronchiseptica</i> (parenteral) ⁽⁶⁾	✓	✓				2 doses, 2-4 wks apart	2 doses, 2-4 wks apart	Annual
Bb +/- CPiV and CAV (IN) ⁽⁷⁾	✓					1 dose	1 dose	Annual
Bb +/- CPiV (oral) ⁽⁸⁾	✓					1 dose	1 dose	Annual
Canine influenza virus (CIV) ⁽⁹⁾	✓	✓				2 doses, 2-4 wks apart	2 doses, 2-4 wks apart	Annual
<i>Borrelia burgdorferi</i> ⁽¹⁰⁾		✓	✓			2 doses, 2-4 wks apart	2 doses, 2-4 wks apart	Annual

Bb, *Bordetella bronchiseptica*; CAV, canine adenovirus (infectious canine hepatitis); CDV, canine distemper virus; CIV, canine influenza virus; CPiV, canine parainfluenza virus; CPV, canine parvovirus; DOI, duration of immunity; IN, intranasal; MDA, maternally derived antibody; MLV, modified live virus; revax, revaccinate; wk, week.

✓ - core vaccine; ✓ - can be considered core where the disease is prevalent; ✓ - non-core vaccine.

(1) If CDV, CPV and CAV protocol begins at <8 wks of age, or interval between vaccines is <3 wks, the number of doses is increased so the last dose is given at ≥16 wks of age. The dose at 16+ wks of age is the most important, when MDA may have waned and the puppy should respond to vaccination. **(2)** To confirm protective immunity for CDV, CPV and CAV in a puppy, it is possible to perform a gold standard or a point-of-care (with high specificity and positive predictive value) serological test at least 4 wks after the vaccination given at 16+ wks. A seropositive puppy does not require the 26-wk vaccine and can be revaccinated 3 years later. Seronegative puppies should be revaccinated and retested. If the puppy again tests negative, it should be considered a non-responder that is possibly incapable of developing protective immunity against this antigen. **(3)** Serologic testing for CDV, CPV and CAV can also be an alternative to routine triennial (q 3 years) revaccination. A negative test result indicates that revaccination is recommended. Seropositive animals are protected and don't need to be revaccinated that year. **(4)** A single dose of MLV or recombinant vaccine will likely protect most dogs. **(5)** Use of CPiV as a mucosal vaccine in combination with *Bordetella bronchiseptica* may be preferable. **(6)** Use of a mucosal vaccine may be preferable. **(7)** Vaccination can start as early as 3 or 8 wks of age, depending on the manufacturer. **(8)** There is some evidence that the intranasal route provides superior clinical outcomes compared to the oral route. **(9)** Vaccination can start as early as 6 wks of age. **(10)** Vaccination can start as early as 9 wks for most vaccines, followed by annual revaccination, preferably before the beginning of tick season. The use of this vaccine is controversial. **(11)** Depending on the licensed DOI.

Recommended Canine Vaccination

Example of a canine vaccination schedule if puppies are first presented at 8 weeks of age.

VACCINE	8 WK	12 WK	16+ WK ⁽¹⁾	20+ WK ⁽²⁾	26 WK	DOGS >16 WK	DOGS >26 WK	REVACCINATION
CDV, CPV, CAV; MLV or recom	✔	✔	✔	serologic testing	✔	2 doses, 2-4 wks apart ⁽⁴⁾ ; revax @ 26 wk	1 dose	Triennial ⁽³⁾
Rabies		✔				1 dose	1 dose	Annual or triennial ⁽¹¹⁾
Leptospirosis	✔	✔				2 doses, 2-4 wks apart	2 doses, 2-4 wks apart	Annual
CPiV (parenteral) ⁽⁵⁾	✔	✔	✔			2 doses, 2-4 wks apart	2 doses, 2-4 wks apart	Annual
<i>B. bronchiseptica</i> (parenteral) ⁽⁶⁾	✔	✔				2 doses, 2-4 wks apart	2 doses, 2-4 wks apart	Annual
Bb +/- CPiV and CAV (IN) ⁽⁷⁾	✔					1 dose	1 dose	Annual
Bb +/- CPiV (oral) ⁽⁸⁾	✔					1 dose	1 dose	Annual
CIV ⁽⁹⁾	✔	✔				2 doses, 2-4 wks apart	2 doses, 2-4 wks apart	Annual
<i>Borrelia burgdorferi</i> ⁽¹⁰⁾		✔	✔			2 doses, 2-4 wks apart	2 doses, 2-4 wks apart	Annual

Bb, *Bordetella bronchiseptica*; CAV, canine adenovirus (infectious canine hepatitis); CDV, canine distemper virus; CIV, canine influenza virus; CPiV, canine parainfluenza virus; CPV, canine parvovirus; DOI, duration of immunity; IN, intranasal; MDA, maternally derived antibody; MLV, modified live virus; recom, recombinant; revax, revaccinate; wk, weeks.

✔ - core vaccine; ✔ - can be considered core where the disease is present; ✔ - non-core vaccine.

(1) If CDV, CPV and CAV protocol begins at <8 wks of age, or interval between vaccines is <3 wks, the number of doses is increased so the last dose is given at ≥16 wks of age. The dose at 16+ wks of age is the most important, when MDA may have waned and the puppy should respond to vaccination. **(2)** To confirm protective immunity for CDV, CPV and CAV in a puppy, it is possible to perform a gold standard or a point-of-care (with high specificity and positive predictive value) serological test at least 4 weeks after the vaccination given at 16+ weeks. A seropositive puppy does not require the 26-week vaccine and can be revaccinated 3 years later. Seronegative puppies should be revaccinated and retested. If the puppy again tests negative, it should be considered a non-responder that is possibly incapable of developing protective immunity against this antigen. **(3)** Serologic testing for CDV, CPV and CAV can also be an alternative to routine triennial (q 3 years) revaccination. A negative test result indicates that revaccination is recommended. Seropositive animals are protected and don't need to be revaccinated that year. **(4)** A single dose of MLV or recombinant vaccine will likely protect most dogs. **(5)** Use of CPiV as a mucosal vaccine in combination with *Bordetella bronchiseptica* may be preferable. **(6)** Use of a mucosal vaccine may be preferable. **(7)** Vaccination can start as early as 3 or 8 weeks of age, depending on the manufacturer. **(8)** There is some evidence that the intranasal route provides superior clinical outcomes compared to the oral route. **(9)** Vaccination can start as early as 6 weeks of age. **(10)** Vaccination can start as early as 9 weeks for most vaccines, followed by annual revaccination, preferably before the beginning of tick season. The use of this vaccine is controversial. **(11)** Depending on the licensed DOI.

If FPV/FCV/FHV-1 begins at <8 wks of age, or interval between vaccines is <3 wks, the number of doses is increased so the last dose is given at ≥16 wks of age. Some kittens have MDA at 20 wks of age, so primary series could be extended to 20 wks of age, with another vaccine given at 26 wks of age. See chs. 201 and 205.

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Conversion Between Système International and Common Units

Hormone Assays

MEASUREMENT	SI UNIT	COMMON UNIT	COMMON → SI*	SI → COMMON*	EXAMPLE
Aldosterone	pmol/L	ng/dL	27.7	0.036	10 ng/dL = 277 pmol/L
Corticotropin (ACTH)	pmol/L	pg/mL	0.22	4.51	100 pg/mL = 22 pmol/L
Cortisol	nmol/L	μg/dL	27.59	0.036	10 μg/dL = 275.9 nmol/L
C-peptide	nmol/L	ng/mL	0.331	3.02	1 ng/mL = 0.331 nmol/L
β-Endorphin	pmol/L	pg/mL	0.292	3.43	1 pg/mL = 0.292 pmol/L
Epinephrine	pmol/L	pg/mL	5.46	0.183	10 pg/mL = 54.6 pg/mL
Estrogen (estradiol)	pmol/L	pg/mL	3.67	0.273	10 pg/mL = 36.7 pmol/L
Gastrin	ng/L	pg/mL	1	1	1 pg/mL = 1 ng/L
Gastrointestinal polypeptide	pmol/L	pg/mL	0.201	4.98	10 pg/mL = 2.01 pmol/L
Glucagon	ng/L	pg/mL	1	1	1 pg/mL = 1 ng/L
Growth hormone	μg/L	ng/mL	1	1	1 ng/mL = 1 μg/L
Insulin	pmol/L	μU/mL	7.18	0.139	10 μU/mL = 71.8 pmol/L
α-Melanocyte stimulating hormone (MSH)	pmol/L	pg/mL	0.601	1.66	10 pg/mL = 6.01 pmol/L
Metanephrine	pmol/L	pg/mL	5.07	0.197	100 pg/mL = 507 pmol/L
Norepinephrine	pmol/L	pg/mL	5.91	0.169	100 pg/mL = 591 pmol/L
Normetanephrine	pmol/L	pg/mL	5.46	0.183	100 pg/mL = 546 pmol/L
Pancreatic polypeptide	mmol/L	mg/dL	0.239	4.18	10 mg/dL = 2.39 mmol/L
Parathyroid hormone (PTH)	pmol/L	pg/mL	0.11	9.1	10 pg/mL = 1.1 pmol/L
Progesterone	nmol/L	ng/mL	3.18	0.315	10 ng/mL = 31.8 nmol/L
Prolactin	μg/L	ng/mL	1	1	1 ng/mL = 1 μg/L
Renin	ng/L/s	ng/mL/h	0.278	3.6	1 ng/mL/h = 0.278 ng/L/s
Somatostatin	pmol/L	pg/mL	0.611	1.64	10 pg/mL = 6.11 pmol/L
Testosterone	nmol/L	ng/mL	3.47	0.288	10 ng/mL = 34.7 nmol/L
Thyroxine (T ₄)	nmol/L	μg/dL	12.87	0.078	1 μg/dL = 12.87 nmol/L
Free thyroxine (fT ₄)	pmol/L	ng/dL	12.87	0.078	1 μg/dL = 12.87 nmol/L
Triiodothyronine (T ₃)	nmol/L	μg/dL	0.0154	64.9	100 μg/dL = 1.54 nmol/L
Vasoactive intestinal polypeptide	pmol/L	pg/mL	0.301	3.33	10 pg/mL = 3.01 pmol/L

*Factor to multiply to convert from one unit to other.

From Feldman EC, Nelson RW, Reusch CE. *Canine & Feline Endocrinology*. 4th ed. Elsevier; 2015.

Common Serum Chemistry Data

MEASUREMENT	SI UNIT	COMMON UNIT	COMMON → SI*	SI → COMMON*	EXAMPLE
Albumin	g/L	g/dL	10	0.1	1 g/dL = 10 g/L
Bile acids	μmol/L	mg/L	2.55	0.392	10 mg/L = 25.5 μmol/L
Bilirubin	μmol/L	mg/dL	17.1	0.058	10 mg/dL = 171 μmol/L
Calcium	mmol/L	mg/dL	0.25	4	10 mg/dL = 2.5 mmol/L
Carbon dioxide content	mmol/L	mEq/L	1	1	10 mEq/L = 10 mmol/L
Chloride	mmol/L	mEq/L	1	1	10 mEq/L = 10 mmol/L
Cholesterol	mmol/L	mg/dL	0.026	38.7	100 mg/dL = 2.6 mmol/L
Creatinine	μmol/L	mg/dL	88.4	0.011	1 mg/dL = 88 μmol/L
Creatinine clearance	mL/s	mL/min	0.017	60	0.1 mL/s = 6 mL/min
Glucose	mmol/L	mg/dL	0.056	18	100 mg/dL = 5.6 mmol/L
Inorganic phosphorus	mmol/L	mg/dL	0.323	3.1	10 mg/dL = 3.23 mmol/L
Magnesium	mmol/L	mg/dL	0.41	2.44	1 mg/dL = 0.41 mmol/L
Osmolality	mmol/kg	mOsm/kg	1	1	1 mOsm/kg = 1 mmol/kg
Potassium	mmol/L	mEq/L	1	1	1 mEq/L = 1 mmol/L
Protein, total	g/L	g/dL	10	0.1	1 g/dL = 10 g/L
Sodium	mmol/L	mEq/L	1	1	1 mEq/L = 1 mmol/L
Triglycerides	mmol/L	mg/dL	0.011	88.3	100 mg/dL = 1.13 mmol/L
Urea nitrogen	mmol/L	mg/dL	0.357	2.8	10 mg/dL = 3.57 mmol/L

*Factor to multiply to convert from one unit to other.

From Feldman EC, Nelson RW, Reusch CE. *Canine & Feline Endocrinology*. 4th ed. Elsevier; 2015.

Body Weight to Body Surface Area Correlation

Dogs

WEIGHT, kg (lb)	BSA (m ²)	WEIGHT, kg (lb)	BSA (m ²)
0.5 (1.1)	0.07	41 (90)	1.26
1 (2.2)	0.11	42 (92.5)	1.28
1.5 (3.3)	0.14	43 (94.5)	1.31
2 (4.4)	0.18	44 (97)	1.33
2.5 (5.5)	0.19	45 (99)	1.35
3 (6.6)	0.22	46 (101)	1.37
3.5 (7.7)	0.24	47 (103.5)	1.39
4 (8.8)	0.27	48 (105.5)	1.40
4.5 (10)	0.29	49 (108)	1.42
5 (11)	0.31	50 (110)	1.44
6 (13.2)	0.35	51 (112)	1.46
7 (15.4)	0.39	52 (114.5)	1.48
8 (17.6)	0.42	53 (116.5)	1.50
9 (20)	0.46	54 (119)	1.52
10 (22)	0.49	55 (121)	1.54
11 (24.5)	0.52	56 (123)	1.56
12 (26.5)	0.55	57 (125.5)	1.58
13 (28.5)	0.59	58 (127.5)	1.59
14 (31)	0.62	59 (130)	1.61
15 (33)	0.64	60 (132)	1.63
16 (35)	0.67	61 (134)	1.65
17 (37.5)	0.70	62 (136.5)	1.67
18 (39.5)	0.73	63 (138.5)	1.69
19 (42)	0.76	64 (141)	1.70
20 (44)	0.78	65 (143)	1.72
21 (46)	0.81	66 (145)	1.74
22 (48.5)	0.83	67 (147.5)	1.76
23 (50.5)	0.86	68 (149.5)	1.77
24 (53)	0.88	69 (152)	1.79
25 (55)	0.91	70 (154)	1.81
26 (57)	0.93	71 (156)	1.83
27 (59.5)	0.96	72 (158.5)	1.84
28 (61.5)	0.98	73 (160.5)	1.86
29 (64)	1.00	74 (163)	1.88
30 (66)	1.03	75 (165)	1.89
31 (68)	1.05	76 (167)	1.91
32 (70.5)	1.07	77 (169.5)	1.93
33 (72.5)	1.09	78 (171.5)	1.94
34 (75)	1.12	79 (174)	1.96
35 (77)	1.14	80 (176.5)	1.98
36 (79)	1.16		
37 (81.5)	1.18		
38 (83.5)	1.20		
39 (86)	1.22		
40 (88)	1.24		

Hill RC, Scott KC. Energy requirements and body surface area of cats and dogs. *J Am Vet Med Assoc.* 2004;225:689-694.
BSA, Body surface area; BSA of dogs = 0.105 m²/body weight (kg)^{0.67}.

Cats

WEIGHT, kg (lb)	BSA (m ²)
0.5 (1.1)	0.07
1 (2.2)	0.11
1.5 (3.3)	0.14
2 (4.4)	0.17
2.5 (5.5)	0.2
3 (6.6)	0.22
3.5 (7.7)	0.24
4 (8.8)	0.25
4.5 (10)	0.26
5 (11)	0.27
5.5 (12)	0.28
6 (13.2)	0.29
6.5 (14.3)	0.3
7 (15.4)	0.31
7.5 (16.5)	0.32
8 (17.6)	0.33
9 (20)	0.34
10 (22)	0.36

Hill RC, Scott KC. Energy requirements and body surface area of cats and dogs. *J Am Vet Med Assoc.* 2004;225:689-694.

BSA, Body surface area; BSA of cats that weigh ≤2.5 kg: body surface area = 0.11 m² × body weight (kg)^{0.67}; cats that weigh >2.5 kg: body surface area = 0.143 m² × body weight (kg)^{0.4}.

SECTION I

Veterinary Medicine Worldwide

CHAPTER 1

Client Communication

Laura D. Garrett

Communication is an integral part of providing medical care. Studies in human medicine have shown that the consumer perception of health care quality is highly dependent on the quality of interactions with the doctor.¹ A meta-analysis of 26 studies assessing patients' and clinicians' nonverbal communication during clinical interactions and relevant outcomes found clinician warmth and listening were associated with greater patient satisfaction ($p < 0.001$ both), while nurse negativity was associated with less patient satisfaction ($p < 0.001$).² Also, consumer satisfaction levels impact clinical outcomes: people who like their doctors do better.^{3,4} Other studies have shown that effective physician-patient communication has been correlated with several outcomes including diagnostic accuracy, improved health status (blood pressure, blood glucose, etc.), improved adherence rates, better patient and physician satisfaction, and decreased malpractice risk.^{1,5-11}

Client satisfaction/retention is increased with good communication. One survey showed that out of a multitude of factors pet owners desire in their veterinarian, the top factor was being kind and gentle, second was respectful and informative, and third was that there was a reputation for high quality care. Price was selected as ninth in importance.¹² A more recent study surveyed over 1400 clients in the UK and Australia, and client relationships was noted to be one of the most important factors for respondents. Specific comments in that area included wanting to be listened to and have their knowledge taken into account and also the need for being shown empathy.¹³ All members of the veterinary care team can play key roles in creating positive communications with clients. Showing kindness and respectfulness while providing information are all aspects of communication—aspects that can be challenging in difficult situations and can be improved upon with the use of specific skills and with practice.¹⁴⁻¹⁶ Communication skills training may be one piece to help with preventing burnout and stress in practice.^{17,18} A recent study assessing stress and conflict in the veterinary work place identified problems associated with communication between veterinarians and animal owners as one of the major issues.¹⁹ There are a myriad of communication techniques and skills that can be widely used in practice; this chapter will focus on four core skills, with examples of their applications.

NONVERBAL COMMUNICATION

A large percent of communication is via nonverbal channels. Thus, information that is not hidden is being exchanged at all times—both from the client to the veterinarian, and vice versa. The nonverbal aspects of communication are like a poker player's tell: they give away what a client may be thinking or feeling, possibly contrary to what is being said verbally. Emotions, which can be clues to underlying thoughts, are much more often communicated nonverbally than verbally. For example, a person can be recognized as being angry because they raise the volume of their voice, have a different tone, change their posture, etc., not because they say "I'm so angry."

Mixed messages occur when the verbal and nonverbal messages disagree. In these situations, the detected nonverbal message is typically more accurate and needs to be addressed. When asked if instructions are understood, a client that quietly and hesitantly, with a questioning tone, says "yes" without meeting the speaker's eyes is nonverbally saying they do not understand. Paying attention to that message, investigating it, and trying to clarify things at that time can save misunderstanding and upset in the future. ("From your tone, I'm getting the sense that I may have been confusing. What questions do you have for me?")

Being aware of and intentionally controlling one's own nonverbals is a useful communication tool.²⁰ Physicians that sat during a post-operative visit with patients were perceived to have spent more time than those that stood, although there was no difference in actual time spent.²¹ A study evaluating how veterinarian-client-patient interactions influenced client adherence to recommendations for dental or surgical procedures found that high empathetic tone and low hurried and rushed tones from the veterinarian correlated positively to clients' subsequent adherence.²² Another paper involving clinic appointments in small animal practices found that veterinarian warmth, a quality conveyed nonverbally, led to higher post-visit client satisfaction survey scores (while empathy statements directed to the pet did not).²³

Another benefit to becoming aware of and following nonverbal clues is that they take up no extra time during an interaction. They are going on constantly during all interactions, and one only

needs to consciously note them, and adjust oneself or comment on them, to help guide the discussion in a beneficial manner.

EMPATHY

Empathy does not mean one feels what the client feels, but rather that one can try to imagine what the client is experiencing. It is the proverbial “walking in someone else’s shoes,” and a key point is not only to imagine that experience but to then express those thoughts back to the client. Showing empathy is a key part in building rapport with a client; it signals that one is available to join in with the client in helping them with their pet and their concerns.^{24,25} Empathy can be shown in both verbal and nonverbal ways. Three key points of empathy are having a client feel seen, heard, and accepted.

Being seen means not only physically seen, but seen as an individual person and not just a “client.”²⁶ Ways to show back to the client that they are seen are to comment on a unique aspect of that individual unrelated to their pet’s medical concerns, such as how their trip to the clinic went, the team logo on their shirt, their pet’s collar, etc. It is also important that the client knows they are seen as a person when it comes to the medical issues, and that their emotions about these issues are noticed. A good way to show this is by verbally stating what is seen: “you seem worried,” “you look very scared.” While to the speaker these statements may seem awkward or obvious at first, clients often greatly appreciate them. Firstly, clients value the empathy and bond more with the veterinarian that shows it. Secondly, by bringing the emotion to the forefront, it can be dealt with and thus allow the client to feel it more and move on in the discussion about their pet. A statement as simple as “I can see this is difficult for you; I can’t imagine how hard it is for you to leave her overnight,” can be grounding for a client and may allow them to refocus on the medical conversation. Nonverbal ways to show a client they are seen are to use appropriate speaking tone and rate—for example, quiet, slower speaking in times of sadness—or posture in response to the client. Handing a box of tissues to a crying client is also an easy and effective means of showing empathy.

Being heard is a similar concept to being seen; the veterinarian not only needs to listen to the client, but needs to show them that they are heard, and ideally understood. A good stem for an empathy statement that summarizes what is being sensed from what the client is saying is “it sounds like”: “It sounds like you are really struggling with this decision.” Nonverbal showing includes items such as appropriate facial expressions, nodding, and leaning in towards the client.^{27,28}

Being accepted is an inherent desire in people, and this acceptance will help an owner to be open and honest with the care team member and help them also to voice concerns or questions that they may be embarrassed to mention otherwise. Intentionally using statements to show clients they are not being judged: “You were in a very difficult situation,” that what they are experiencing is normal: “Pets absolutely can become members of families, and their loss can be devastating,” or that disclose a connection with oneself: “My cat has behavioral issues too,” are tools that will show empathy through acceptance.

These techniques for expressing empathy become even more critical with clients for whom it is difficult to feel empathy; intentionality in demonstration of empathy can improve the client-veterinarian bond even for clients with whom it is very hard to bond.^{29,30}

OPEN-ENDED QUESTIONS

Open-ended questions, or inquiry, are not just important in obtaining a case history; they are helpful during any discussions,

including testing and treatment choices, as well as for assessing owner understanding. Not only will they prompt more complete information sharing; they also greatly increase the client-veterinarian bond by allowing a client to “tell their story”—a key part to feeling understood and valued as a person. This “story telling” does not need to be very long or unguided; specific techniques (see reflective listening, below) can be used to redirect clients that may be verbose. Very often, open-ended questions save time in a discussion, as they allow the veterinarian to understand the true nature of the client’s concerns without misleading results that the use of only closed-ended questions may provide. In one study, asking clients about their concerns at the start of the appointment led to a 4-times decrease in odds of a new concern being raised as the appointment was finishing, with open-ended inquiries leading to more complete lists of concerns.³¹

Closed-ended questions begin with words such as “when, is, did, who, where.” These questions result in very short answers. Closed-ended questions create an atmosphere that is more like an interrogation than an interview, and they are very much centered on what the medical professional wants to know. These questions certainly play a role in an interview—they are helpful in emergency-type situations as well as in clarifying information. They are best used after open-ended questions.

Open-ended questions often begin with “what” or “how” or “tell me.” Avoiding “why” is preferred, as that word seems to carry judgment (“Why did you do that?”). Open-ended questions allow the client to talk and express their thoughts and concerns, and while doing so, use their own natural vocabulary; this allows the veterinarian to ascertain what type of vocabulary to use in return when speaking to the client for greatest understanding. A very helpful way to start a visit with a client is to ask a big, broad question such as “What has been going on?” If the issue is already known (e.g., the patient has been referred for hematuria), open-ended inquiry can still be used while including the known information: “So, Fluffy is having blood in her urine. Tell me what has been going on.” This technique both allows the client to know that the veterinarian is informed about their case and also allows the client to share more and feel that their thoughts are worthwhile. Open-ended questions are a powerful tool in improving a bond with the client, versus a rapid fire, just-the-facts interrogation style: “When did you notice the blood? Is she drinking more? Any straining?” etc.

In regards to conversations after the initial visit, open-ended questions continue to be very helpful. Even with ongoing cases and familiar owners, it is important to avoid assuming an understanding of what the client is thinking. Open-ended questions can prevent misunderstandings during difficult discussions. For example, rather than “Are you thinking about euthanasia?” and having an owner get upset because they were not, an open-ended alternative would be “What are your thoughts about options from here?” “Ask rather than tell” is a worthwhile rule of thumb. When a new diagnosis has been made, asking a client what they know about the disease, rather than jumping into sharing details about the problem, can save time in a discussion and allow for both information sharing to begin at an appropriate level and correction of any misperceptions.³² This asking importantly also shows the client that their knowledge is valued, leading to a better client/veterinarian bond as the client feels treated as a unique and worthwhile individual.

REFLECTIVE LISTENING

Reflective listening is the technique by which an individual “reflects” back what has been said, thus showing interest in and understanding of the meaning of what the speaker is saying. With this technique, the listener repeats back to the client what was said

or even implied, often via paraphrasing. Reflective listening is an excellent tool for checking understanding. Reflective statements not only allow the client to know they are heard and seen, they also allow the client to correct any misconceptions and add to the veterinarian's summary if needed.

A few simple tools for reflective listening include nonverbals such as nods, smiles, mm-hhms, and hand gestures. Also, when unsure what to say, or wanting an owner to expound, a simple verbal repeat of the last word of phrase said can be helpful: Client: "Momo has just been acting crazy." Veterinarian: "Crazy?" A reflective statement is also an excellent way to interrupt and then redirect the client that may be talking too much or on a topic that is not relevant. "It sounds like he was such an adorable puppy! What are your top concerns for today?"

Reflective statements can seem awkward at first; having a "stem" with which to begin is very helpful. The classic stem is "what I hear you saying is..." Other stems may feel more natural and include "so, you are saying..." "it sounds like..." "you are...". A complete statement could be something like: "It sounds like you are worried that Turner is having a poor quality of life right now." The client can then correct if that is not their main concern, or can feel a sense of relief that they are understood if that is the concern. Another example of a reflective statement in action is: "So you are concerned about the cost of the treatment?" This may elicit a "Yes, it seems very expensive" or maybe "No, the cost isn't the problem, it is the time involved." Thus, the true concern can be addressed. Paraphrasing is one of the most effective listening tools available; it both conveys that what someone is saying is important and also verifies correct understanding of what is being expressed, leading to improved diagnostic and therapeutic patient management.

SUMMARY

By actively employing communication techniques in daily interactions with clients, improved outcomes for the pet, the client and the health care team can be expected. Employment of these techniques takes concentration; intentional communication is a phrase used to describe this effort. While at first the effort may seem artificial and uncomfortable, the skills, as all learned skills, will grow over time, become a more natural part of one's communication with others, and bring positive value and impact into clinical practice.

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CHAPTER 2

The Medical History

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THE GOALS OF TAKING A MEDICAL HISTORY

The primary purpose of taking a medical history, the anamnesis, is to evaluate the patient's overall health status and to identify chief concerns that require diagnostic or therapeutic intervention.^{1,2} An additional reason for the patient profile is to gather information that guides decision-making.^{1,2} For instance, it is essential to explore familial history that could support a diagnosis of hypertrophic cardiomyopathy. It is equally important to inquire if the patient has experienced any adverse drug reactions in the past that could complicate treatment if the same medication were prescribed again. The fundamental belief in *primum non nocere*—first, do no harm—is deeply entrenched in the practice of medicine, and history-taking is the clinician's first opportunity to identify and flag information in a medical record that relates to patient safety.

THE DIAGNOSTIC VALUE OF ANAMNESIS

The successful practice of veterinary medicine requires attentive history-taking and physical examination skills that contribute to diagnostic accuracy through clinical reasoning.^{2,3} Traditionally, the value of touch, as a sense, has been prioritized by clinicians, who have been trained to use their hands to palpate key structures and to differentiate normal from abnormal physical exam findings (ch. 3). However, clinicians also gather data through observation and audition. Moreover, astute clinicians promptly learn that body odors provide olfactory clues about a patient's underlying health status (ch. 33). For instance, breath acetone is a reliable indicator of ketosis.

Clinicians must gather, interpret, and act upon patient-specific data in order to recommend therapeutic interventions that positively influence patient outcomes.³ In practices that model relationship-centered care, clinical reasoning begins with a solicitation of the veterinary client's story.^{2,4} It is increasingly common practice for clinics to ask that clients complete pre-appointment questionnaires as a means of gathering preliminary data about the patient prior to the office visit. These data capture the abbreviated version of the client's story, which can then be reviewed by the veterinary team, whose role is to clarify and/or expand upon key themes.

Within the consultation room, the client is invited to share the patient's presenting concern with veterinary team members as well as any potentially related, central or peripheral, details.⁴ Such subjective data provide a starting point for the medical interview, during which time patient-specific details are actively solicited, acknowledged, validated, and clarified through structured inquiry.² This process of history-taking (e.g., anamnesis) is fundamental to the medical interview (i.e., the consultation) which a clinician typically will conduct over 100,000 times during

their career.⁵⁻⁷ Each consultation is an opportunity to practice and refine interview skills that collectively pave the way to diagnosis. Up to three-fourths of all medical diagnoses in human health-care can be made based upon case-specific historical findings alone.^{2,8,9} Similar outcomes are anticipated in veterinary practice. Although it may be tempting to replace the anamnesis with laboratory tests, given the evolution of diagnostic medicine, there is no substitute for taking a health history.^{10,11}

THE ROLES OF CONDUCT AND CONTEXT IN HISTORY-TAKING

There is not a single method by which to lead the medical interview. History-taking requires an understanding of content and conduct, at the heart of which are interpersonal skills. In order to gather sufficient details about the patient and its health state, clinicians must interact with and engage the client.^{2,4} Successful clinicians adopt an approach that blends their own inherent comfort level with communication strengths (ch. 1). Open-ended questions, appropriate non-verbal cues, empathy, reflective listening, and regard provide a foundation for making connections with clients and inspiring dialogue.^{4,12} Eliciting the client's perspective and assessing the client's knowledge are add-on communication skills that facilitate information-sharing and build respect through shared decision-making.¹²

The breadth and depth of the patient history will vary depending upon the context in which the patient presents.^{6,11} A patient in crisis that is being evaluated on an emergent basis requires triage and abbreviated history-taking, as compared to a patient that is being evaluated at a new puppy or kitten visit.^{11,13} Even wellness visits require clinicians to skillfully extract those details that are pertinent to patient care in order to strike a balance between being comprehensive and being efficient. The astute clinician learns which patient-specific details to prioritize rather than others and when it is most appropriate to do so. Selective questioning is deliberate and comes with experience. This process has not traditionally been taught in veterinary curricula, which often emphasize the need to be thorough. Yet how much of a patient's history is "enough"? Which information is time-sensitive? What do clinicians need to know about the patient? What information can be appropriately withheld until later? Consider the case of a cat that presents for evaluation of anuria and presumptive acute kidney injury. It is essential to solicit the client's perspective as to whether this cat had exposure to ethylene glycol. It is not essential, in the moment, to discern the patient's deworming status. Rather than consider the history as a one-time event—as static and "all-or-none"—it can be more effective to think of it as an evolving dialogue, a conversation that can be clarified along the way, as patient-specific needs arise.

THE COMPREHENSIVE MEDICAL HISTORY

A comprehensive medical history is the veterinary team's attempt to gather a complete portrait of the patient and its current state of health. Information-gathering is exhaustive, taking into consideration both patient-specific and external factors, such as the physical and social environment.^{2,4,11,14,15} New patient visits lend themselves well to comprehensive history-taking because they represent the veterinary team's first opportunity to become acquainted with the patient and, in some cases, the client. On other occasions, the patient is new to the practice, but the client is not, in which case the new patient's profile is added to the client's pre-existing database.

To be complete, the comprehensive medical history includes the following content areas^{2,4,11,16,17}:

- Patient's signalment (age, sex, sexual status, breed, and species)
- Identifying features (microchip, tattoo, coat color, coat length)
- History of ownership (i.e., adopted versus purchased, from where, and how long ago?)
- Client expectations for the patient (i.e., companion versus working dog, show dog or breeding stock)
- Presenting or chief concern ("What brings you in today?")
- Client expectations for the chief concern (i.e., cure/resolution versus palliation; medical versus surgical intervention; home care; cost)
- Patient's lifestyle (i.e., strictly indoor, strictly outdoor, or in-door/outdoor)
- Activity level (i.e., sedentary versus active versus athletic)
- Behavioral history
- Travel history (i.e., in-state, interstate travel, out-of-country; by car or by plane)
- Serological status (i.e., feline leukemia [FeLV] and feline immunodeficiency virus [FIV])
- Dietary history and thirst, including voiding frequency and elimination habits
- History of preventative care (i.e., vaccinations and flea/tick/heartworm prophylaxis)
- Past pertinent familial, medical, dental, surgical, and reproductive history
- Past pertinent diagnostic tests, including both laboratory investigations and imaging
- Past pertinent therapeutic trials and outcomes
- Current medications, vitamins, and supplements
- Client's experience with illness or loss in previously owned or current pets, as well as illness or loss among close family and friends
- Client's confidence in the diagnosis and/or treatment recommendations
- Client's ability to comply and/or adhere to treatment recommendations

To facilitate comprehensive history-taking, practices may develop standardized questionnaires for clients to complete prior to the visit.¹¹ The information that is gathered forms the basis of the patient profile, which the veterinary team can expand upon during the consultation itself.¹¹ Clarifying questions may be asked to gather additional details, fill in the gaps, or resolve ambiguity.¹¹

CLARIFYING THE CHIEF CONCERN

When a patient presents for evaluation of problem "x," it is essential to solicit the client's account of the chief concern and how it may have evolved.¹¹ Sometimes the information that a client has to share with the veterinary team is quite specific (e.g., frequency of emesis). On other occasions, the client may only be able to report non-specific changes in the patient's appearance, attitude,

or demeanor (e.g., the patient is "not herself" [ch. 10]). There can be value even in vague accounts. Clients often are perceptive and can pick up on subtleties that clinicians may miss because they are less familiar with what is considered "normal" for that patient. For instance, a client's report of a change in the quality of their dog's bark may prompt an investigation that ultimately diagnoses laryngeal paralysis.

Question design impacts the quantity and quality of information that the client chooses to share with the veterinary team, so it is critical to consider phrasing of questions to maximize data mining.^{4,11} Open-ended questions are an ideal starting point for inquiry because they encourage the client to share their story.^{4,11} Open-ended questions often begin with *tell me*, as in *tell me what you're seeing at home when you say that Pillsbury has labored breathing*.^{4,11} Other options for open-ended statements include *describe "x" for me*, *share "x" with me*, and *help me to understand "x"*.^{4,11} A mix of appropriate open- and closed-ended questions may be selected to clarify the following aspects of the chief concern¹¹:

- Who? As in: *Who else at home is affected? With whom has the patient been in contact?*
- What? As in: *What are you noticing that is concerning?*
- When? As in: *When did the problem start? When was the last episode?*
- Where? As in: *Where, specifically, is the patient urinating outside of the litter box?*
- Why? As in: *Why do you think the problem started? Why is behavior "x" most concerning to you?*
- How? As in: *How have you tried to resolve the issue on your own?*

Clarifying Concerns About Body Condition Score

Nutritional assessment of each pet at every visit is advised by the American Animal Hospital Association (chs. 72 and 145 and see inside covers) because overweight and obese patients are at increased risk for orthopedic disease and endocrinopathy.¹⁸⁻²¹ Taking a complete nutritional history is the first step to developing dietary recommendations for those who are at risk.^{18,21} These data extend beyond the patient's main diet to include treats and supplements, source of diet (commercial versus home-prepared), preparation of diet (cooked versus raw), feeding routine (*ad libitum* versus meal-fed), meal frequency, meal volume, whether rations are measured or eyeballed, and who within the household is responsible for feeding.¹⁸ The most common question to be asked when gathering a dietary history takes the form of, *what*, as in *what kind of food is being fed?*²² Yet the answers that are solicited by this style of questioning reflect significant underreporting of human foods and treats.²² A recent study by Coe et al. confirmed that question design can overcome underreporting by asking this instead: *"Tell me everything he [or she] eats throughout a day, starting first thing in the morning right through to the end of the day."*²³

Clarifying Concerns About Elimination

House-soiling is a common reason that companion animals are relinquished to shelters.²⁴ Inappropriate deposition of urine and/or feces creates tension within the household and detracts from the human-animal bond. Yet, is the patient truly eliminating or is the patient marking? Are these so-called problem behaviors truly behavioral or might they have an underlying medical etiology?²⁴ History-taking plays an essential role in establishing the cause of house-soiling and in defining the solution (ch. 11).²⁴ Inquiries should concentrate on the timeline of events, the home layout, litter box details (in feline cases), the surface(s) on which elimination occurs, interspecific social interactions, and environmental enrichment, in addition to patient-specific data, such as elimination posture, urine volume, and attempts to cover soiled areas.^{17,24}

Clarifying Gastrointestinal Concerns

Clients may report that the patient is vomiting; however, this requires clarification to differentiate emesis from regurgitation (ch. 48).²⁵ Both problems point to very distinct sets of differential diagnoses. Is the process active or passive? Is there forceful ejection of stomach contents? Does the client witness abdominal wall contractions? Is the event preceded by lip-licking, ptyalism, or any other signs that might be attributed to nausea? All the above would suggest true emesis as compared to the passive process of regurgitation.²⁵

Clarifying Orthopedic Concerns

Osteoarthritis adversely impacts patient welfare, yet clients may not report lameness, or they may attribute associated signs to normal aging (ch. 31).^{26,27} Reactions to pain may be misconstrued as problem behaviors, and some canine breeds are perceived to be pain-resistant.^{26,28} It may be especially challenging for clients to recognize musculoskeletal pain in cats because they can be masters of hiding illness and may rarely manifest mobility issues as overt lameness.²⁸ Rather than asking owners if their cats are lame, astute clinicians should concentrate on whether there have been changes in jumping or stair use, litterbox habits, claw-sharpening, grooming, or sociability.²⁸ Clients are more apt to notice a change in mood or interactions with housemates, other pets and people.²⁸ Clients may even pick up on focal sensitivities—that is, the cat may be averse to being picked up or pet in certain regions of the body. Clients may not always volunteer this information during history-taking, so it may be strongly beneficial to explore this area proactively when appropriate.

Clarifying Respiratory Concerns

Clients may report that the patient's breathing is labored (ch. 37); however, this description requires clarification. What is the client witnessing at home that conveys respiratory distress? Clients may mistake reverse sneezing for respiratory distress.²⁹ Clarifying how the patient's chest wall moves normally as compared to now can be helpful. Is chest wall movement increased in frequency or accentuated? If so, does it involve inspiration, expiration, or both? It may be difficult to appreciate which phase(s) of the respiratory cycle is/are affected in a tachypneic patient. In this case, the presence/absence of obstructive upper airway sounds may be much more helpful for making the anatomic diagnosis of upper versus lower airway. Is the patient exercise-intolerant or is chest wall motion and diaphragmatic excursion present and exaggerated at rest? Asking clients to videorecord episodes is advantageous. Clinicians can both observe and interpret each videoed event as it unfolds. Recording noisy breathers can also be beneficial because clinicians can differentiate high-pitched raspy stridor from the low-pitched snoring sound that is characteristic of stertor.^{29,30}

THE ABBREVIATED MEDICAL HISTORY

A comprehensive medical history is not always realistic to achieve due to the time constraints of most consultations. As clinicians gain experience, they develop pattern recognition. This, combined with clinical acumen and the ability to avoid leading questions, allows them to interpret new knowledge within the context of what they have experienced before and to make complex decisions about how to proceed even in those cases where information may be incomplete.³ In this way, the experienced clinician moves towards abbreviating the medical history through iterative hypothesis testing.³¹ History-taking is limited to gathering data based upon relevance and the likelihood of confirming or refuting diagnostic hypotheses.³¹ Inquiries are adapted to the circumstances rather than casting a broad net over the patient's entire health history.

Nowhere in veterinary medicine is this more evident than emergency practice. Triage requires prioritization of patient needs so that life-threatening problems are addressed first (ch. 119). The medical history is, by necessity, abbreviated to include the patient's signalment, chief concern, onset and progression of clinical signs, any treatment that has been initiated, and pre-existing conditions.¹³ The history is expanded upon as needed depending upon the evolution of the problem list.¹³ It would be inappropriate to concentrate on the vaccination history of a hit-by-car dog as the primary focus, yet it is essential for the clinician to know that the patient has underlying cardiomyopathy. Toxicologic histories are also, by default, often abbreviated (ch. 15). In addition to content areas that are covered during triage, inquiry often centers around environmental exposures, including access to human and veterinary prescriptions, over-the-counter products, nutraceuticals, herbal supplements, and illicit drugs.³²

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CHAPTER 3

The Physical Examination

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This chapter is enhanced with the following electronic assets on Elsevier eBooks+: 22 Videos and 1 Client Information Sheet.

ACRONYMS

PMI point of maximal intensity

SOAP Subjective, Objective, Assessment, and Plan

GATHERING INFORMATION BEFORE THE VETERINARIAN ENTERS THE EXAM ROOM

The physical examination begins before the veterinarian ever touches the animal.¹⁻³ The traditional teachings of look, smell, and listen are as important as ever. Excellent veterinarians avoid making diagnostic decisions driven by laboratory-derived data that bypass the physical examination. This chapter is founded on the concept that veterinarians must bring together data from the history, physical examination, and diagnostic tests to care for an animal in the context of its life—including the expectations the owner envisions for the pet (ch. 1). Algorithms alone are of limited value without an excellent history (ch. 2) and physical examination. Increasing reliance on “artificial intelligence” is **not** recommended in favor of this traditional approach.

When possible, the animal's temperature and weight should be recorded before the veterinarian enters the examination room. This provides the nursing staff the chance to communicate with the pet's owner (client, caretaker), gather pertinent information, note changes in weight over time, and identify the owner's primary concerns or request(s). The veterinarian may review these findings with the owner if there are questions about the history or why the pet is being presented for examination. Unskilled staff should not be doing “TPRs” (measuring temperature, pulse, and respiration) since mistakes can be made and the veterinarian and nurses/technicians may lose valuable information such as the anal tone, skin around the perianal region, incorrect weight, etc. Also, skilled technicians know how to talk to the owner and the animal and help to relax rather than frighten the pet.

This is a good time for the staff to record current medications and dosages being administered, prophylactic agents being utilized (e.g., for heartworm disease, ectoparasites, internal parasites), and herbal or other supplements being administered (ch. 2). The animal's vaccination and reproductive status (i.e., spayed, neutered, or last heat cycle) should be identified in the record. Knowing the current diet and amount being fed can save valuable doctor time

and should be recorded (ch. 145). Notation of medications should always be accompanied by the owner's perception of their efficacy since this information may influence future treatment and prognosis. Nursing staff may also utilize this time to provide valuable information to the pet owner on subjects the veterinarian may have limited time to discuss. Examples include new vaccine programs, wellness programs, microchipping information, behavior, and products to aid in training and health as well as office financial policies. Having discussed these topics allows the veterinarian to concentrate on medicine rather than finances. Problems here should be noted in the medical record by the nursing staff.

It is important to always attempt to provide the pet owner with an on-time, efficient examination. Reading material (magazines of interest to a wide variety of pet owners and their children) should be available if there is a likelihood of the owner having to wait. Pet owners should be given an indication of the doctor's schedule and the length of a delay, if any is anticipated. Providing the owner with this information can offset frustration, anger, or anxiety. If the hospital has brochures for new pet owners or information about hospital services, this is a good time to deliver these and to allow the owner to browse through the material. Likewise, instructional video recordings may be of interest to the owner (ch. 1).

OBSERVING THE PET AND MEETING THE CARETAKER

The process of performing a physical exam often is described as an isolated event that takes place only between the veterinarian and the animal. However, a physical examination also is a type of ritual that demonstrates to an owner how the veterinarian will interact with the patient. This is as true in veterinary medicine as in human medicine: “When a sick patient is examined with skill, it goes a long way in earning trust and authority.”⁴ A pet owner's confidence in the veterinarian allows a dialog to emerge regarding physical exam findings, the owner's interest and experience around health concerns brought up by physical exam findings, and the veterinarian and the owner's perspectives on investigating physical exam abnormalities.